

That which is claimed is

1. A method for the preparation of a branched siloxane comprising the steps of:

- a) mixing a compound having the general formula  $(\text{SiO}_{4/2})(\text{R}^a\text{R}^b\text{SiO}_{1/2})_4$  with a cyclic polydiorganosiloxane, and/or a substantially linear hydroxy terminated polydiorganosiloxane wherein each  $\text{R}^a$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms an alkenyl group having from 1 to 6 carbon atoms and an alkynyl group having from 1 to 6 carbon atoms, the  $\text{R}^a$  substituent in at least part of the compound being selected from alkenyl and alkynyl, and each  $\text{R}^b$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, an aryl group, an alkoxy group, an acrylate group and a methacrylate group;
- b) causing the mixture to react in the presence of an acid or phosphazene base catalyst at a temperature of up to  $180^\circ\text{C}$ ; and
- c) neutralising the reaction mixture.

2. A release coating composition comprising

i) a branched siloxane consisting of:-

(a) at least one Q unit of the formula  $(\text{SiO}_{4/2})$  and

(b) from 15 to 995 D units of the formula  $\text{R}^b_2\text{SiO}_{2/2}$

which units (a) and (b) may be inter-linked in any appropriate combination, and

(c) M units of the formula  $\text{R}^a\text{R}^b_2\text{SiO}_{1/2}$ ,

wherein each  $\text{R}^a$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, an alkenyl group having from 1 to 6 carbon atoms and an alkynyl group having from 1 to 6 carbon atoms, at least three  $\text{R}^a$  substituents in the branched siloxane being alkenyl or alkynyl units, and each  $\text{R}^b$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, an aryl group, an alkoxy group, an acrylate group and a methacrylate group;

ii) an organohydrogenpolysiloxane cross-linking agent in an amount such that the ratio of the total number of Si-H groups in the composition to aliphatically unsaturated hydrocarbon groups in the composition is from 0.9:1 to 3:1;

iii) a sufficient amount of a hydrosilylation catalyst effective to catalyse the reaction between the branched siloxane and the cross-linking agent; and optionally

iv) one or more constituents selected from the group consisting of a hydrosilylation inhibitor, a linear alkenyl terminated polydiorganosiloxane, a bath life extender, a silicone release modifier, an adhesion promoter one or more fillers, one or more reactive diluents, and anchorage additives.

2025.10.10 14:26:50

3. A multi-pack release coating composition according to claim 2 comprising a first pack comprising the branched siloxane and inhibitor, a second pack comprising a release modifier and inhibitor, a third pack comprising the catalyst and a fourth pack comprising the cross-linking agent.

4. A multi-pack release coating composition according to claim 2 comprising a first pack comprising the branched siloxane and catalyst, a second pack comprising a release modifier and the catalyst and a third pack comprising the cross-linking agent and inhibitor.

TOPT-245660

5. A silicone based release modifier composition comprising

A) a branched siloxane consisting of:-

(a) at least one Q unit of the formula  $(\text{SiO}_{4/2})$  and

(b) from 15 to 995 D units of the formula  $\text{R}^b_2\text{SiO}_{2/2}$

which units (a) and (b) may be inter-linked in any appropriate combination, and

(c) M units of the formula  $\text{R}^a\text{R}^b_2\text{SiO}_{1/2}$ ,

wherein each  $\text{R}^a$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, an alkenyl group having from 1 to 6 carbon atoms and an alkynyl group having from 1 to 6 carbon atoms, at least three  $\text{R}^a$  substituents in the branched siloxane being alkenyl or alkynyl units, and each  $\text{R}^b$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, an aryl group, an alkoxy group, an acrylate group and a methacrylate group; and

B) at least one additional component selected from:-

i) an alkenylated silicone resin

ii) an alkenylated polydiorganosiloxane,

iii) one or more primary alkenes containing from 14 to 30 carbon atoms, and

iv) one or more branched alkenes containing at least 14 carbon atoms.

6. An article having on at least one surface thereof a layer containing a cured silicone release composition according to claim 2.

7. A release coating composition comprising

i) a branched siloxane containing at least three aliphatically unsaturated hydrocarbon groups, terminated by units of the formula  $R^a R^b_2 SiO_{1/2}$  and otherwise consisting of:-

(a) at least one unit of the formula  $(SiO_{4/2})$ ; and

(b) at least two polydiorganosiloxane chains of the formula  $(R^b_2 SiO_{2/2})_n$ , where each n is independently from 2 to 100, the total  $R^b_2 SiO_{2/2}$  units in the branched siloxane being from 15 to 995 units, wherein each  $R^a$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, an alkenyl group having from 1 to 6 carbon atoms and an alkynyl group having from 1 to 6 carbon atoms and each  $R^b$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, an aryl group, an alkoxy group, an acrylate group and a methacrylate group;

ii) an organohydrogenpolysiloxane cross-linking agent in an amount such that the ratio of the total number of Si-H groups in the composition to aliphatically unsaturated hydrocarbon groups in the composition is from 0.9:1 to 3:1;

iii) a sufficient amount of a hydrosilylation catalyst effective to catalyse the reaction between the branched siloxane and the cross-linking agent; and optionally

iv) one or more constituents selected from the group consisting of a hydrosilylation inhibitor, a linear alkenyl terminated polydiorganosiloxane, a bath life extender, a silicone release modifier, an adhesion promoter one or more fillers, one or more reactive diluents, and anchorage additives.

8. A silicone based release modifier composition comprising

A) a branched siloxane containing at least three aliphatically unsaturated hydrocarbon groups, terminated by units of the formula  $R^aR^b_2SiO_{1/2}$  and otherwise consisting of:-

(a) at least one unit of the formula  $(SiO_{4/2})$ ; and

(b) at least two polydiorganosiloxane chains of the formula  $(R^b_2SiO_{2/2})_n$ , where each n is independently from 2 to 100, the total  $R^b_2SiO_{2/2}$  units in the branched siloxane being from 15 to 995 units, wherein each  $R^a$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, an alkenyl group having from 1 to 6 carbon atoms and an alkynyl group having from 1 to 6 carbon atoms and each  $R^b$  substituent is selected from the group consisting of an alkyl group having from 1 to 6 carbon atoms, an aryl group, an alkoxy group, an acrylate group and a methacrylate group; and

B) at least one additional component selected from:-

i) an alkenylated silicone resin

ii) an alkenylated polydiorganosiloxane, and

iii) one or more primary alkenes containing from 14 to 30 carbon atoms, and

iv) one or more branched alkenes containing at least 14 carbon atoms.

9. A release coating composition according to claim 2 wherein at least 50% of  $R^a$  substituents are alkenyl groups.

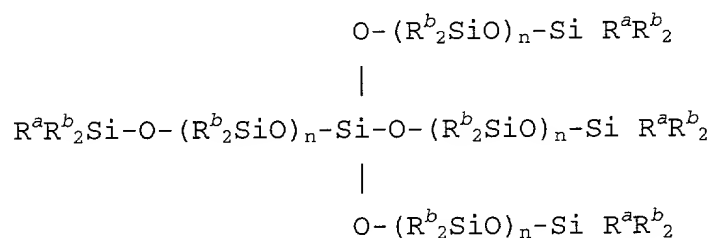
10. A release coating composition according to claim 9 wherein each  $R^a$  substituent is an alkenyl group.

11. A release coating composition according to claim 2 wherein the alkenyl groups are selected from vinyl and hexenyl groups.

12. A release coating composition according to claim 2 wherein each  $R^b$  substituent is an alkyl group selected from methyl and ethyl.

13. A release coating composition according to claim 2 where the branched siloxane contains at least two polydiorganosiloxane chains of the formula  $(R^b_2SiO_{2/2})_n$  where each n is independently from 2 to 100.

14. A release coating composition according to claim 13 where the branched siloxane has the general formula



where each n is independently from 1 to 100.

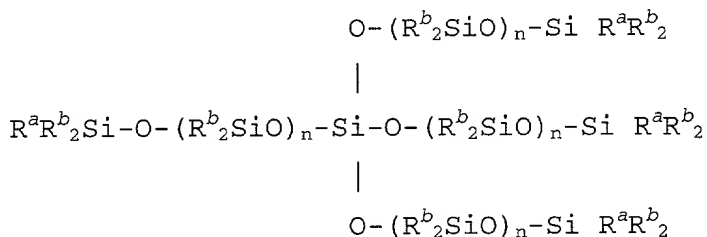
15. A release coating composition according to claim 2 having from 20 to 250 siloxane units.

16. A silicone based release modifier composition according to Claim 5 wherein each  $R^b$  substituent is an alkyl group selected from methyl and ethyl.

17. A silicone based release modifier composition according to claim 5 where the branched siloxane contains at least two polydiorganosiloxane chains of the formula  $(R^b_2SiO_{2/2})_n$  where each n is independently from 2 to 100.

TOPT 44660

18. A silicone based release modifier composition according to claim 17 where the branched siloxane has the general formula



where each  $n$  is independently from 1 to 100.

19. A release coating composition according to Claim 7 where the branched siloxane has from 20 to 250 siloxane units.

20. A release coating composition according to Claim 8 where the branched siloxane has from 20 to 250 siloxane units.